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ABSTRACT

A qualitative study investigated the viewpoints and beliefs of five non-traditional secondary mathematics student teachers regarding using content literacy strategies. The five student teachers were military officers preparing for a second career as secondary mathematics teachers. Data included interviews, observations, and written materials from the subjects' preservice and student teaching experiences. Results indicated: (1) during student teaching, subjects' practice was substantially different from their beliefs concerning the use of content literacy strategies expressed at the start of the study; (2) differences appeared related to influences of cooperating teachers, perceived student needs, and curricular materials; (3) several student teachers expressed strong beliefs about appropriate instruction for students placed in differing ability groupings; and (4) an important aspect of belief which emerged relates to definitions of reading and writing in mathematics--several of the student teachers thought their students were not reading, when in fact they were solving written problems, making and reading graphs, etc. (RS)

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Beliefs About Content Literacy Meet "Reality" in Secondary School Mathematics: Non-Traditional Student Teachers Share Their Experiences

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Introduction

This study focused on five non-traditional secondary mathematics student teachers who had expressed positive attitudes toward using content literacy strategies at the end of their content literacy course. The student teachers were followed into their student teaching semester to describe influences they encountered, decisions made, and ways in which their content literacy-related beliefs developed and changed. All of the student teachers were military officers preparing for a second career as secondary mathematics teachers. They ranged in age from 42-50.

Research questions which guided the study were:

a) What influences affected the student teachers' uses of and beliefs about content literacy instructional strategies in secondary mathematics?

b) How did their content literacy-related beliefs change or remain the same during the student teaching semester?

Theoretical Framework

Educators in both content area literacy and mathematics strongly advocate that mathematics teachers include a variety of language activities in their instruction (National Council of

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Teachers of Mathematics, 1989; Vacca & Vacca, 1993). Content literacy experts have advocated the teaching of reading and writing along with content for over 60 years (Moore, Readence & Rickelman, 1983); studies in literacy and learning during the past twenty years provide strong support for the theoretical position that classroom instruction in which students read, write and participate in discussions encourages them to construct meaning and serves to improve both content learning and language skills (Alvermann & Moore, 1991; Ruddell, 1993).

Likewise, the National Council of Teachers of Mathematics encourages teachers to "promote communication about mathematics" (p. 25), through activities such as "asking students to clarify and justify their ideas orally and in writing" (p. 35). Researchers report, however, that many secondary teachers rarely use suggested content literacy methods (Alvermann & Moore, 1991; Moore, 1992). Although content literacy courses can help preservice secondary teachers develop positive attitudes toward content literacy strategies, it appears that influences in the context of the secondary school may deter them from using these strategies once they begin teaching (Alvermann, O'Brien & Dillon, 1990; McNeil, 1986; O'Brien, 1988; Stewart, 1989/90; Sturtevant, 1992). The student teaching experience may be crucial in that it constitutes the new teacher's first attempt to put beliefs into practice. A small body of research which documents contextual conditions student teachers must negotiate when they attempt to implement content literacy strategies has begun to develop,

however, within this literature studies specific to mathematics teachers are lacking.

Methodology/Data Sources

This was a qualitative study designed to describe viewpoints and beliefs from the perspective of the participants (Glaser & Strauss, 1967; Merriam, 1988). Data were collected from interviews, observations and written materials.

The five (5) participants had all been members of the researcher's content literacy methods class during the semester directly before their student teaching experience (Spring 1993; Fall 1993). This course presented reading, writing and discussion as active, constructive processes (Vacca & Vacca, 1993). At the end of the course all students completed an open-ended exit questionnaire in which they were asked to describe their beliefs about using strategies taught in the course. All those selected as participants had expressed on the questionnaire an understanding of the theory and methods taught in the course and stated that they hoped to use some of the methods during student teaching. They also expressed an interest in participating in the study.

During their student teaching semester, each pre-service teacher participated in two interviews, one at the beginning of student teaching and one near the end. In the preliminary interview, student teachers were asked to discuss a variety of topics related to their beliefs about using reading, writing and discussion activities in mathematics. They were also asked to

identify specific instructional activities they would like to use while student teaching. Preliminary interviews lasted about one half hour.

Near the end of student teaching, each student teacher participated in a second interview, which was scheduled immediately after a class observation. Field notes of classroom activities and discourse were hand-recorded during the observation. The main purpose of the class observation was to help guide the questions asked during the second interview. In the second interview, student teachers were again asked about their instructional beliefs related to using reading, writing and discussion in mathematics. They were also asked to describe types of literacy activities they had tried, the effects of these activities, and constraints, dilemmas and support they found in the secondary school setting. Second interviews lasted approximately 45 minutes each.

Classroom materials, such as copies of text materials, sample lesson plans, tests and worksheets from the observation were also collected. All interviews were audio-recorded. All data from interviews, observations and questionnaires was transcribed, analyzed and summarized using qualitative case study methodology (Glaser & Strauss, 1967; Merriam, 1988).

Summary of Results

1. Although the student teachers indicated similar beliefs about using content literacy strategies at the start of the study, during student teaching their practice was substantially different.

2. Differences appeared related to influences of cooperating teachers, perceived student needs, and curricular materials. For example, two cooperating teachers had decided to implement several types of reading/writing strategies as a result of NCTM (National Council of Teachers of Mathematics) workshops and student teachers in these classrooms also used the strategies. Another student teacher gave substantial reading assignments in algebra because the district was piloting new materials which required these assignments.

3. Several of the student teachers expressed strong beliefs about appropriate instruction for students placed in differing ability groupings; specifically, they came to believe during student teaching that low-achieving and ESL students should be given fewer reading and writing assignments than other students.

4. Another important aspect of belief which has emerged relates to definitions of reading and writing in mathematics - several of the student teachers thought their students were not reading, when in fact they were solving written problems, making and reading graphs, etc.

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